

## CLAIMS

We claim:

1           1.     A process for making a biocompatible biodegradable fleece, the process  
2 comprising:

3           a. providing a solution comprising a crosslinkable synthetic macromer, the synthetic  
4 macromer comprising a polymeric hydrophilic region surrounded by two or more regions each  
5 comprising one or more moieties forming a biodegradable region and a crosslinkable moiety;

6           b. freezing the solution in a desired shape;

7           c. vacuum-drying the solution; and

8           d. crosslinking the crosslinkable macromer  
9 to produce the fleece.

1           2.     The process of claim 1 wherein the vacuum-drying step is performed  
2 before the crosslinking step.

1           3.     The process of claim 1 wherein the vacuum-drying step is performed after  
2 the crosslinking step.

1           4.     The process of claim 1 wherein the macromer solution further comprises  
2 at least one of a polymerization-causing material and a biologically active agent.

1           5.     The process of claim 4 wherein the biologically active agent is selected  
2 from the group consisting of antibiotics, growth regulating molecules, hemostatic agents,

3 antibodies, antigens, transfection vectors, expression vectors, anesthetics, and anti-arrhythmic  
4 agents.

1 6. The process of claim 1, wherein the crosslinking is performed by the use  
2 of at least one of ionizing radiation, non-ionizing radiation, heat, addition of initiators, and  
3 addition of crosslinking chemicals or ions.

1 7. The process of claim 1, wherein the crosslinking is performed by a free  
2 radical polymerization reaction.

1 8. The process of claim 1 further comprising a rinsing of the crosslinked  
2 macromer.

1 9. The process of claim 8 further comprising the step of shredding the  
2 crosslinked macromer after rinsing.

1 10. The process of claim 1 further comprising the step of shredding the  
2 crosslinked macromer to form fleece particulates.

1 11. The process of claim 1 further comprising the step of shredding the  
2 crosslinked macromer after at least one of the freezing step and the vacuum-drying step.

1 12. The process of claim 1 wherein a supporting material is incorporated into  
2 the fleece.

1                   13.    The process of claim 12 where the incorporation of the supporting  
2   material occurs during the freezing step.

1                   14.    A biocompatible biodegradable fleece particulate produced by the process  
2   of claim 10.

1                   15.    The process of claim 10, further comprising the wetting of the fleece  
2   particulates with an aqueous solution.

1                   16.    The process of claim 15 further comprising the adding of at least one of a  
2   cell, a polymerization-causing material, and a biologically active agent to the wetted fleece  
3   particulates.

1                   17.    A biocompatible biodegradable fleece produced by the process of claim 1.

1                   18.    A biocompatible biodegradable fleece particulate produced by the process  
2   of claim 10.

1                   19.    A biocompatible biodegradable fleece particulate produced by the process  
2   of claim 16.

1                   20.    A biocompatible biodegradable fleece, wherein the fleece comprises  
2   crosslinked synthetic macromers, at least one of the synthetic macromers comprising a polymeric  
3   hydrophilic region surrounded by two or more regions each comprising one or more moieties  
4   forming a biodegradable region and a crosslinked moiety, and wherein the fleece is  
5   macroporous.

1           21.    The fleece of claim 20, further comprised of at least one of a cell, a  
2 polymerization-causing material and a biologically active agent.

1           22.    The fleece of claim 20 which is in the form of fleece particulates.

1           23.    The fleece of claim 21 which is in the form of fleece particulates.

1           24.    The fleece of claim 20, comprising a diacrylated polyethylene oxide  
2 comprising biodegradable linkages selected from the group consisting of monomers and  
3 oligomers of carbonates and hydroxyacids.

1           25.    The fleece of claim 24, further comprised of at least one of a cell, a  
2 polymerization-causing material, and a biologically active agent.

1           26.    The fleece of claim 24 which is in the form of fleece particulates.

1           27.    The fleece of claim 25 which is in the form of fleece particulates.

1           28.    The fleece of claim 20, wherein the fleece has at least two regions of  
2 differing composition.

1           29.    The fleece of claim 1, wherein the crosslinkable macromer is water  
2 soluble.

1           30.    The fleece of claim 1, wherein bubbles are incorporated into the solution  
2 before the freezing step.

1                   31.     A slurry comprising the biocompatible fleece particulates of claim 19 and  
2     an aqueous solution.

1                   32.     The slurry of claim 31, wherein the aqueous solution comprises at least  
2     one of a cell, a polymerization-causing material, and a biologically active agent.

1                   33.     A slurry comprising the biocompatible fleece particulates of claim 23 and  
2     an aqueous solution.

1                   34.     The slurry of claim 33, wherein the aqueous solution comprises at least  
2     one of a cell, a polymerization-causing material and a biologically active agent.

1                   35.     A slurry comprising the biocompatible fleece particulates of claim 27 and  
2     an aqueous solution.

1                   36.     The slurry of claim 35, wherein the aqueous solution comprises at least  
2     one of a cell, a polymerization-causing material, and a biologically active agent.

1                   37.     The method of treating a wound or defect by applying to the wound or  
2     defect the slurry of claim 31.

1                   38.     The method of treating a wound or defect by applying to the wound or  
2     defect the slurry of claim 33.

1                   39.     The method of treating a wound or defect by applying to the wound or  
2     defect the slurry of claim 35.

1           40.     The method of claim 38 wherein the slurry comprises living cells.

1           41.     The method of claim 40 wherein the defect is a chondral defect, and the  
2 living cells are chondrocytes.

1           42.     The method of claim 41 further comprising applying a primer solution to  
2 the outer edges of the chondral defect, and applying a sealant to the primed area of the defect to  
3 seal the slurry to the defect.

1           43.     The method of claim 42, wherein the sealant is applied as a biodegradable,  
2 polymerizable macromer, and the macromer is subsequently polymerized.

1           44.     The method of claim 41 further comprising the step of applying a primer  
2 solution to the outer edges of the chondral defect, applying a sealant to the primed area of the  
3 defect to cover the chondral defect with the sealant, and then applying the slurry between the  
4 sealant and the defect.

1           45.     The method of claim 44, wherein the sealant is applied as a biodegradable,  
2 polymerizable macromer, and the macromer is subsequently polymerized.

1           46.     The method of claim 43, wherein the polymerization is performed by use  
2 of at least one of ionizing radiation, non-ionizing radiation, heat, addition of initiators, and  
3 addition of crosslinking chemicals or ions.

1           47.    The method of claim 38 where the treatment comprises at least one of  
2 hemostasis, protection from the atmosphere, protection from drying, and delivering a cell or  
3 biologically active agent to the wound.

1           48.    The use of the biocompatible biodegradable fleece of claim 20 for drug  
2 delivery.

1           49.    The use of the biocompatible biodegradable fleece of claim 20 to prevent  
2 tissue adhesions.

1           50.    The use of the biocompatible biodegradable fleece of claim 20 to culture  
2 cells and the subsequent implantation of the fleece with the cells to a defect.

1           51.    The use of the biocompatible biodegradable fleece of claim 20 to provide  
2 a substrate for tissue engineering.

1           52.    The method of treating a wound or defect by applying to the wound or  
2 defect a slurry comprising an aqueous solution and biocompatible fleece particulates of claim 27,  
3 which comprises cells selected from the group consisting of chondrocytes, cardiomyocytes, and  
4 stem cells.

1           53.    The method of claim 52, wherein the stem cells are mesenchymal stem  
2 cells.

1           54.    A slurry comprising an aqueous solution and biocompatible fleece  
2 particulates of claim 27, which comprises cells selected from the group consisting of  
3 chondrocytes, cardiomyocytes, and stem cells.

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